for directing prepared sample into a PCR tube; and one or more channels configured to transmit volumes of fluid in the range 0.1-50 μl; wherein the one or more channels ensure passage of sample, reagents, and fluid between the sample inlet, the reagent inlet, and the outlet; and wherein the microfluidic component, in conjunction with an external source of heat, is configured to react the sample and the reagents, in order to produce a prepared sample suitable for analyzing the one or more polynucleotides.

[0014] Other embodiments still further include a multi-sample cartridge configured to accept a number of samples, in particular embodiments eight samples, wherein the samples include at least a first sample and a second sample, wherein the first sample and the second sample each contain one or more polynucleotides. The samples can each be converted into respective forms suitable for analyzing the one or more polynucleotides, the multi-sample cartridge comprising: at least a first microfluidic component and a second microfluidic component, separably affixed to one another, wherein each of the first microfluidic component and the second microfluidic component is as previously described herein, and wherein the first microfluidic component accepts the first sample, and wherein the second microfluidic component accepts the second sample. The sample inlets of adjacent cartridges are reasonably spaced apart from one another to prevent any contamination of one sample inlet from another sample when a user introduces a sample into any one cartridge.

[0015] In preferred embodiments, the multi-sample cartridge has a size substantially the same as that of a 96-well plate as is customarily used in the art. Advantageously, then, the cartridge may be used with plate handlers used elsewhere in the art. Still more preferably, however, the multi-sample cartridge is designed so that a spacing between the centroids of mounts for PCR tubes is 9 mm, which is an industry-recognized standard. This means that, in certain embodiments the center-to-center distance between nozzles in the cartridge that deliver materials to adjacent PCR tubes, as further described herein, is 9 mm. In still other preferred embodiments, the multi-sample cartridge comprises a first PCR tube attached to the first microfluidic component, and a second PCR tube attached to the second microfluidic component. Each PCR tube is preferably removably affixed to the cartridge.

[0016] Additionally described herein are methods, including but not limited to a method of converting a sample comprising a number of cells that contain one or more polynucleotides into a form suitable for analyzing the one or more polynucleotides, the method comprising: introducing from about 0.1-2.0 mL of the sample and an excess quantity of air into a bulk lysis chamber; lysing cells in the sample by applying heat to the bulk lysis chamber, to raise the sample to a first temperature, thereby producing a lysate containing the one or more polynucleotides; capturing one or more polynucleotides in the lysate on an affinity matrix, such as one or more beads; causing the beads to leave the bulk lysis chamber and be trapped on a filter; washing the beads with a wash reagent; displacing the wash reagent with a release buffer; heating the beads to a second temperature, thereby releasing the one or more polynucleotides; and causing the one or more neutralized polynucleotides to be transferred to a PCR tube. In preferred embodiments, the sample is dissolved in one or more lysis reagents in the bulk lysis chamber prior to applying heat to it. In other preferred embodiments, after heating the beads to the second temperature, the method comprises combining a neutralization buffer with the one or more polynucleotides to produce one or more neutralized polynucleotides, which are then transferred to the PCR tube.

[0017] Also further described herein are methods that include a method of analyzing a sample comprising a number of cells that contain one or more polynucleotides, the method comprising: converting the sample into a form suitable for analyzing the one or more polynucleotides, using methods as described herein; and analyzing the sample using a method selected from the group consisting of: PCR, TMA, SDA, and NASBA.

[0018] Further details of one or more embodiments are set forth in the accompanying drawings, and the description hereinbelow. Other features, objects, and advantages thereof will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

[0019] FIG. **1** shows a perspective view of an exemplary microfluidic system.

[0020] FIGS. **2**A-**2**F show exploded views of the exemplary microfluidic system of FIG. **1**, and its operation in conjunction with a microfluidic cartridge.

[0021] FIGS. **3**A, **3**B and **3**C illustrate plan views of exemplary multi-sample cartridges.

[0022] FIG. **4**A shows a cross-sectional view of an exemplary microfluidic cartridge as further described herein and a plan view of a microfluidic component of the cartridge.

[0023] FIG. **4**B shows an exploded view of an exemplary cartridge showing various pieces of its manufacture.

[0024] FIG. **5** shows a view of an underside of a microfluidic cartridge, as further described herein.

[0025] FIG. **6** shows a view of an exemplary nozzle for dispensing material into a PCR tube, as found on the underside of a microfluidic cartridge, as further described herein.

[0026] FIG. **7** shows an exemplary array of heater actuators used in conjunction with a microfluidic cartridge, as further described herein.

[0027] FIG. **8** shows part of the array of heater actuators of FIG. **7**, in conjunction with part of a microfluidic cartridge, as further described herein.

[0028] FIG. **9** shows a region of the part of the array of heater actuators of FIG. **8**, in conjunction with part of a microfluidic cartridge, as further described herein.

[0029] FIG. **10** shows a plan view of an exemplary microfluidic component as further described herein.

[0030] FIG. **11** is a cross-sectional view of an exemplary processing region for retaining polynucleotides and/or separating polynucleotides from inhibitors.

[0031] FIG. **12** depicts an exemplary valve.

[0032] FIGS. **13**A and **13**B illustrate an exemplary double valve in respectively open and closed states.